

EXHIBIT 80

**DECLARATION OF CORY SZCZEPANIK IN SUPPORT OF HUAWEI'S
OPPOSITION TO SAMSUNG'S MOTION FOR SUMMARY JUDGMENT**

REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION**

HUAWEI TECHNOLOGIES CO., LTD.,
HUAWEI DEVICE USA, INC., and
HUAWEI TECHNOLOGIES USA, INC.,

Plaintiff(s)/Counterclaim
Defendants,

vs.

SAMSUNG ELECTRONICS CO., LTD,
SAMSUNG ELECTRONICS AMERICA,
INC.,

Defendants / Counterclaim-
Plaintiffs,

and

SAMSUNG RESEARCH AMERICA, INC.,

Defendant,

v.

HISILICON TECHNOLOGIES CO., LTD.,

Counterclaim-Defendant.

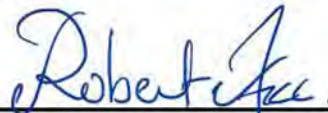
Case Number: 3:16-cv-2787-WHO

**CONTAINS "HIGHLY CONFIDENTIAL
– ATTORNEYS' EYES ONLY"
INFORMATION THAT IS SUBJECT TO
THE COURT'S PROTECTIVE ORDER**

**EXPERT REPORT OF DR. ROBERT AKL, D.SC.
REGARDING INFRINGEMENT OF UNITED STATES PATENT
NO. 8,724,613**

Executed on this April 27, 2018, in Denton, Texas.

By



Dr. Robert Akl, D.Sc.

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and other services using the MBSFN frame structure in the manner specified by Claim 5. The Accused Devices for all networks therefore infringe Claim 5.

E. THE SAMSUNG ACCUSED DEVICES COMPLY WITH THE LTE STANDARD

126. As I explained above, any device that is capable of receiving the eMBMS service or any other service that uses the MBSFN frame structure will infringe the ’613 Patent, because the LTE standards specify that the eMBMS service or other such service must be received by the device in the same manner as specified by Claims 1 and 5 of the ’613 Patent.

127. Below, I review additional evidence that the Samsung Accused Devices indeed are capable of receiving services such as eMBMS in the manner specified by the LTE standards and Claims 1 and 5 of the ’613 Patent.

1. Samsung Admissions

128. Samsung has admitted that the Accused Devices are capable of communicating on an LTE network within the United States. (Samsung’s Fourth Supplemental Response to Huawei’s Interrogatory No. 1.) (“Samsung further responds that the Samsung products identified in Fourth Amended Exhibit A to Interrogatories 2 and 3 are capable of communicating on an LTE network in the United States.”); *see also* Samsung Answer to Complaint at ¶¶ 49-51. The Samsung products identified in Fourth Amended Exhibit A include all of the Accused Devices. As I explained above, to be capable of communicating on an LTE network using eMBMS or another service that utilizes the MBSFN frame structure, the Samsung Accused Devices must practice Claims 1 and 5 of the ’613 Patent.

129. In its Answer, “Samsung admits that cellular standards enable interoperability” and further “Samsung admits that mobile devices must comply with one or more cellular standards to interoperate and be commercially viable.” *See* Samsung Answer ¶ 22. I agree with this admission.

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130. In its Answer, “Samsung admits that once a particular technology is adopted into a standard, manufacturers must integrate the technology into their products to comply with the standard.” *See* Samsung Answer ¶ 24. I agree with this admission.

131. In its Countercomplaint, Samsung states that, “[v]arious wireless devices rely on technologies developed and incorporated in industry standards. Those devices connect to a variety of wireless networks, including the networks of wireless carriers to provide telecommunications services. Carriers operate wireless systems that enable users to place and receive telephone calls, send and receive e-mails, and connect to the Internet through wireless devices. The devices and networks communicate using radio signals that carry encoded information through the air and which are relayed via fixed wireless communication base stations. Both Huawei and Samsung sell wireless devices that connect to networks, such as . . . LTE networks.” *See* Samsung Countercomplaint ¶ 20. I agree with this admission.

132. In its Countercomplaint, Samsung states that, “Companies around the world manufacture wireless devices. These manufacturers, at least in the United States typically sell their phones to the mobile wireless carriers, which in turn, sell the phones to users. The wireless device must be compatible with network equipment for each of them to work properly within a network. Because interoperability is crucial for telecommunications, the industry uses common mobile wireless technology and participates in the crucial process of standards development, ensuring an efficient and functional system.” *See* Samsung Countercomplaint ¶ 21. I agree with this admission.

133. In its Countercomplaint, Samsung states that, “In order to harmonize the efforts of these companies, regional standard setting organizations (“SSOs”) were developed to create technical specification that companies could follow to ensure their products would be compatible

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with other companies’ products and systems.” *See* Samsung Countercomplaint ¶ 22. I agree with this admission.

134. Samsung admits that “3GPP functions as a standard-setting organization for certain UMTS and LTE standards,” “3GPP produces and maintains the world’s most widely adopted cellular standards such as the Universal Mobile Telecommunications Standard (‘UMTS’) and Long Term Evolution (‘LTE’) standard,” that “3GPP, in part through its technical committees, maintains and approves standards,” that “3GPP technical specifications are incorporated by ETSI into relevant standards,” that “3GPP develops these standards through an open voluntary consensus-based process,” that “Huawei actively participated in 3GPP’s development of the 3G and 4G standards,” and that Huawei has a “portfolio of patents essential to UMTS and LTE standards.” *See* Samsung Answer ¶¶ 21, 23, 63-64; Samsung Countercomplaint ¶¶ 279-80, 333-34, 371, 425. I agree with these admissions.

135. Samsung further admits that “[m]obile telephones and other mobile devices, including those manufactured and sold by Samsung, must comply with the technical standards promulgated by ETSI in conjunction with 3GPP, which promulgate mobile standards as drafted by their members acting through consensus,” that “[m]obile devices that do not conform to the adopted standards will not work with network infrastructure equipment,” that “once a particular technology is adopted into a standard, manufacturers must integrate the technology into their products to comply with the standard,” that “[m]obile devices that do not use the technologies specified in the standard thus have little, if any, market value, regardless of technical merit,” and that “[s]martphones and other telecommunications products need to comply with numerous standards.” *See* Samsung Answer ¶ 24; Samsung Countercomplaint ¶¶ 350, 352, 353, 383, 400, 406, 407, 437. I generally agree with the technical aspects of these statements.

2. Testimony of Michael Song

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3. Testimony of Illkwon Yun

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4. Testimony of Byung Wook Kim

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5. Testimony of Hyeonsoo Kim

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6. Testimony of Dong-Ha Nam

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⁸ The J7 is not a Samsung Accused Device.

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[REDACTED]

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7. Testing Documents

[REDACTED]

(a) The Accused Samsung Devices with Qualcomm Baseband Chipsets

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EXPERT REPORT OF DR. ROBERT AKL ON
INFRINGEMENT OF U.S. PATENT NO. 8,724,613

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EXPERT REPORT OF DR. ROBERT AKL ON
INFRINGEMENT OF U.S. PATENT NO. 8,724,613

Exhibit	Bates Nos.	Exhibit Content	Deposition Testimony	Accused Device
General				
341	848252	3GPP TS 36.523-1	[REDACTED]	All

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Exhibit	Bates Nos.	Exhibit Content	Deposition Testimony	Accused Device
			[REDACTED]	
			[REDACTED]	
363	851491	3GPP TS 36.521-2	[REDACTED]	All
			[REDACTED]	
340	848244	3GPP TS 36.521-1, Section 8, page 1030 and Section 10, pages 2144-2155 list numerous tests about MBMS	[REDACTED]	[REDACTED]
			[REDACTED]	

[REDACTED]
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(Exh. 382

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Exhibit	Bates Nos.	Exhibit Content	Deposition Testimony	Accused Device

97

T-Mobile

99

Exhibit	Bates Nos.	Exhibit Content	Deposition Testimony	Accused Device
			[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

CONTAINS "HIGHLY CONFIDENTIAL – SOURCE CODE" INFORMATION

Exhibit	Bates Nos.	Exhibit Content	Deposition Testimony	Accused Device
		[REDACTED]	[REDACTED]	[REDACTED]
		[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
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CONTAINS "HIGHLY CONFIDENTIAL – SOURCE CODE" INFORMATION

Exhibit	Bates Nos.	Exhibit Content	Deposition Testimony	Accused Device
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
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8. Samsung Marketing and Advertisements

238. The 3GPP standards development organization has an official LTE trademark and logo, shown below.

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239. The 3GPP standards organization expressly provides that “[i]mplementers wishing to declare conformity to the 3GPP specifications are given permission to use the trademark LTE and logo to mark their equipment and documentation with the LTE, LTE-Advanced and LTE-Advanced Pro logo and the acronym LTE.” <http://www.3gpp.org/IMG/pdf/lte-and-lte-advanced-logo-guidelines.pdf> HW Samsung 00861018- 21.

240. Samsung uses the official LTE trademark, logo and acronym not only in its web-based disclosure of the specifications of the Accused Products, but in a wide variety of product literature. By doing so, Samsung is declaring conformity to the 3GPP LTE standards. For example in the Galaxy 8/8+ User Manual, Samsung uses the LTE trademark in identifying status bar functionality. (SAMSUNG-HNDCA-000118227 at SAMSUNG-HNDCA-000118253). Similarly, In the Galaxy S7, S7 Edge, S6, S6 Edge, S6 Edge Plus, S5 and Note 5 User Manuals, Samsung uses the LTE trademark and logo in identifying Status bar functionality (SAMSUNG-HNDCA-000060850 at SAMSUNG-HNDCA-000060870; SAMSUNG-HNDCA-000062088 at SAMSUNG-HNDCA-00062106; SAMSUNG-HNDCA-000058676 at SAMSUNG-HNDCA-000058704; SAMSUNG-HNDCA-000058877 at SAMSUNG-HNDCA-000058894; SAMSUNG-HNDCA-000059842 at SAMSUNG-HNDCA-000059860; SAMSUNG-HNDCA-000057400 at SAMSUNG-HNDCA-000057418; SAMSUNG-HNDCA-000067299 at SAMSUNG-HNDCA-000067315).

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242. On its website, Samsung discloses specifications for each Samsung Accused Product. These specifications include an identification of the networks on which each of the Accused Product may operate. All of the specifications disclose that the Accused Products can operate on 4G LTE networks and make use of the trademarked name "LTE." Consider, for instance, the Galaxy S8 phone. Under the Specs subheading Network & Connectivity, Samsung lists LTE, indicating that the Galaxy S8 complies with LTE. *See, e.g.,* <http://www.samsung.com/global/galaxy/galaxy-s8/>; HW_Samsung_00846184 at HW_Samsung_00846195. Samsung includes similar information in its current web advertising for the accused Galaxy S8 Plus, S7, S7 Edge, S6, S6 Edge, S6 Edge Plus, S5 and Note 5 for each of the relevant carriers.

Begin Bates	End Bates	Name
HW_Samsung_00861003	HW_Samsung_00861017	Galaxy S8+ 64GB (Verizon).pdf
HW_Samsung_00860989	HW_Samsung_00861002	Galaxy S8+ 64GB (T-Mobile).pdf
HW_Samsung_00860975	HW_Samsung_00860988	Galaxy S8+ 64GB (Sprint).pdf
HW_Samsung_00860961	HW_Samsung_00860974	Galaxy S8+ 64GB (AT&T).pdf
HW_Samsung_00846198	HW_Samsung_00846212	Galaxy S8 64GB (Verizon).pdf
HW_Samsung_00860947	HW_Samsung_00860960	Galaxy S8 64GB (T-Mobile).pdf
HW_Samsung_00860933	HW_Samsung_00860946	Galaxy S8 64GB (Sprint).pdf

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HW Samsung 00846184	HW Samsung 00846197	Galaxy S8 64GB (AT&T).pdf
HW Samsung 00860924	HW Samsung 00860932	Galaxy S7 edge 32GB (Verizon).pdf
HW_Samsung_00861022	HW_Samsung_00861031	Galaxy S7 edge 32GB (T-Mobile).pdf
HW_Samsung_00860915	HW_Samsung_00860923	Galaxy S7 edge 32GB (AT&T).pdf
HW Samsung 00846175	HW Samsung 00846183	Galaxy S7 32GB (Verizon).pdf
HW Samsung 00860905	HW Samsung 00860914	Galaxy S7 32GB (T-Mobile).pdf
HW_Samsung_00846166	HW_Samsung_00846174	Galaxy S7 32GB (AT&T).pdf
HW Samsung 00860890	HW Samsung 00860904	Galaxy S6 Edge+ (Verizon).pdf
HW Samsung 00857873	HW Samsung 00857887	Galaxy S6 Edge+ (Sprint).pdf
HW Samsung 00860866	HW Samsung 00860889	Galaxy S6 Edge+ (AT&T).pdf
HW_Samsung_00860850	HW_Samsung_00860857	Galaxy S6 edge 128GB (Verizon).pdf
HW_Samsung_00860841	HW_Samsung_00860849	Galaxy S6 edge 128GB (T-Mobile).pdf
HW Samsung 00860858	HW Samsung 00860865	Galaxy S6 edge 128GB (Sprint).pdf
HW Samsung 00860833	HW Samsung 00860840	Galaxy S6 edge 128GB (AT&T).pdf
HW_Samsung_00857757	HW_Samsung_00857772	Galaxy S6 Edge (Verizon).pdf
HW_Samsung_00857741	HW_Samsung_00857756	Galaxy S6 Edge (Sprint).pdf
HW Samsung 00846158	HW Samsung 00846165	Galaxy S6 32GB (Verizon).pdf
HW Samsung 00846150	HW Samsung 00846157	Galaxy S6 32GB (AT&T).pdf
HW_Samsung_00860801	HW_Samsung_00860809	Galaxy S6 32GB (T-Mobile).pdf
HW Samsung 00857720	HW Samsung 00857740	Galaxy S6 (Sprint).pdf
HW Samsung 00857841	HW Samsung 00857858	Galaxy S5 (Verizon).pdf
HW Samsung 00857823	HW Samsung 00857840	Galaxy S5 (T-Mobile).pdf
HW_Samsung_00857805	HW_Samsung_00857822	Galaxy S5 (Sprint).pdf

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HW Samsung 00857788	HW Samsung 00857804	Galaxy S5 (AT&T).pdf
HW Samsung 00860622	HW Samsung 00860638	Galaxy Note 5 (Verizon).pdf
HW_Samsung_00860607	HW_Samsung_00860621	Galaxy Note 5 (T-Mobile).pdf
HW_Samsung_00860592	HW_Samsung_00860606	Galaxy Note 5 (Sprint).pdf
HW Samsung 00857773	HW Samsung 00857787	Galaxy Note 5 (AT&T).pdf

9. Qualcomm Source Code

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10. Samsung Source Code

[REDACTED]

[REDACTED]

¹¹ I understand that Qualcomm Inc. has delayed providing certain source code for the Galaxy S5. I reserve the right to supplement my source code analysis if and when such source code is provided. The Galaxy S5 infringes Claims 1 and 5 of the '613 Patent for the reasons I explained above.

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IX. INDIRECT INFRINGEMENT

247. It is my opinion that Samsung also indirectly infringes Claims 1 and 5 of the '613 Patent by inducing infringement. I understand that a party induces patent infringement if it purposefully causes, urges, encourages, or aids another to infringe the claims of a patent. I understand that a party must intend to induce the infringement. To prove that a party induced patent infringement, Huawei must prove that (1) there was an act of direct infringement by another; (2) the party actively encouraged or instructed the other person to use the accused product in an infringing way; and (3) the party (a) knew of the patent and knew that the induced acts would infringe at least one patent claim, or (b) was willfully blind to the patent's existence. I understand that the patentee must prove that the party knowingly induced infringement, not merely that it knowingly induced the acts that constitute infringement.

248. Regarding (1), an act of direct infringement, I explained above how use of Samsung's Accused Devices practice the practice the '613 Patent when an end user uses his or her device to receive a service that utilizes MBSFN frames, such as content via LTE Multimedia Broadcast Multicast Services (eMBMS). For instance, at the claim construction tutorial in this

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case, Samsung’s counsel explained that Samsung’s products on the Verizon network support can use the Verizon Go90 and Verizon Indycar series applications to allow a user to watch TV, pro live sports, and Indycar races using LTE multicast, which is another term for eMBMS. *See* 8/7/2017 Claim Construction Tutorial Tr. at 55:2-11; <https://www.verizonwireless.com/solutions-and-services/apps/go90/>; <https://www.verizonwireless.com/support/go90-faqs/>; <http://www.verizon.com/about/news-tag/go90>; <https://www.dailydot.com/upstream/go90-app-verizon-sports/>; <http://www.teckrr.com/all-you-need-to-know-about-embms/>. The information I cited above regarding the go90 service shows that Verizon has invested heavily in the service, and that it has been used by end users. The facts I cite below regarding the Value of the Invention further confirm that eMBMS has been used by end users of the Samsung Accused Devices.

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X. OTHER TOPICS

A. VALUE OF THE INVENTION

257. The invention of the ’613 Patent contributed an important, valuable technology to LTE. The benefits of the ’613 Patent’s invention include the following:

- Allows dynamic scheduling of unicast and multicast/broadcast services, providing significant bandwidth/spectrum savings. Such broadcast technologies can free up significant network bandwidth, which is a very important consideration given that wireless spectrum is a limited resource for which operators must pay billions of dollars. For instance, according to a study by Nokia, “eMBMS would consume only 0.08 percent of the capacity required by unicast.” B.W. Kim Exh. 499 (HW_Samsung_00848503-07).
- Allows handset users to receive eMBMS and other services utilizing MBSFN technology. Handset users can view live sporting events such as the Super Bowl.
- Saves battery life and processing power for handset users. Fan Tr. at 82:5-21.
- Allows new features to be deployed without impacting older devices. For example, the new CSIRS references signal, or antenna transmission and receiving, or the transmission and receipt of location information, and many other services can use the invention. Fan Tr. at 77:13-24 [REDACTED]

258. Industry participants, such as Samsung, have described eMBMS technology as providing a “new paradigm,” “new revenue streams” for network operators, a “better utiliz[ation of] the available bandwidth,” “essential for advanced communications,” and the basis for the

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Public Safety LTE market which Samsung expects “to grow to over 12 billion dollars in 2020.”

See Song Exh. 471, 475.

259. Verizon hailed eMBMS, which it called LTE Broadcast, as “The Next Big Thing” in a 2013 press release. See <http://www.verizon.com/about/news/vzw/2013/01/verizon-wireless-4G-LTE-broadcast>. In the press release, Verizon stated:

One innovative solution being developed by Verizon to stay ahead of this demand is called LTE Broadcast. Based on evolved Multimedia Broadcast Multicast Service (eMBMS) standards approved by 3GPP, a telecommunications standards group, the technology allows for a very efficient use of LTE spectrum and network, delivering the highest quality, always-on video for everyone without buffering.

LTE Broadcast could allow students on satellite campuses to see a lecture from a star professor, transforming higher education and making it available to more people. Sports leagues could provide additional or exclusive content to their fans who attend live events, enriching their experience at the venue. Municipal governments could reach all their citizens in a specific geographic area with messages important to them.

LTE Broadcast is engineered to efficiently use spectrum, there are no capacity issues or bottlenecks associated with delivering the video. Verizon, with its leading 4G LTE network now in 470 markets in the United States, is developing LTE Broadcast with an eye toward the future and meeting customer demand for innovative video solutions.

260. Qualcomm similarly praises LTE Broadcast as “the most efficient mechanism to distribute the same content to many users.” See <https://www.qualcomm.com/invention/technologies/lte/broadcast>. Qualcomm states that “LTE Broadcast is gaining global momentum, with many operators trialing and announcing launch plans.” See *id.* Qualcomm identifies many use cases for LTE Broadcast, stating that “Venue casting is the most common use case, but there are many other use cases for efficient distribution via LTE Broadcast: Smartphone OS/software updates, breaking news, delivery of e-media, music/audio broadcasting, and even public safety applications. For all these use cases, LTE Broadcast can

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offload data from unicast, significantly improve the user experience and create new revenue opportunities for mobile operators.” *See id.*

261. Qualcomm identifies a number of materials that point to the substantial value of eMBMS, both now and in the future. *See id.* (“Documents”). For instance, a white paper prepared by telecommunications market intelligence company IDC explains that “LTE Broadcast holds the promise of a strong link connecting the current 4G/LTE networks and the 5G networks of the future. The advanced technical capabilities of LTE Broadcast have been thoroughly tested and documented . . . LTE Broadcast will enable mobile operators to deploy a flexible and efficient platform that delivers high-value services to their current customers as well as potential new customers.” *See* <https://www.qualcomm.com/documents/lte-broadcast-whitepaper-idc> at 14. Qualcomm also identifies numerous network operators that embraced LTE Broadcast as of 2014. *See* <https://www.qualcomm.com/documents/lte-broadcast-evolving-and-going-beyond-mobile> at 9. Qualcomm documents produced in this case describe eMBMS as “an efficient broadcast/multicast mechanism to deliver shared content from LTE network to multiple UEs,” that includes “efficient signal combining and boost receiver SNR,” as well as “high operating SNR due to SFN operation.” *See* SAMSUNG-HNDCA-000201802 at 201807.¹²

262. Ericsson has similarly described LTE Broadcast as a “revenue enabler” technology with many use cases. *See* <https://archive.ericsson.net/service/internet/picov/get?DocNo=1/28701-FGD101187&Lang=EN&HighestFree=Y> at 1, 5.

¹² The Qualcomm document also contains an overview of eMBMS, including a description of the channel, frame, and subframe structure, that is consistent with the LTE standards I discussed above. *See* SAMSUNG-HNDCA-000201802 at 201818-23.

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263. Samsung has echoed support for eMBMS technology in its own white papers and press releases. Samsung has predicted continued growth, and has referred to a “need for widespread adoption of this technology.” *See* <https://www.samsung.com/global/business/business-images/resource/white-paper/2013/02/eMBMS-with-Samsung-0.pdf>; <https://www.samsung.com/global/business/networks/insights/news/samsung-39-s-solution-for-embms-is-best-new-technology/>; <https://www.samsung.com/global/business/networks/insights/news/advances-smart-embms-solution-with-improved-video-experience/> (“As video today accounts for approximately 55% of all mobile data traffic, and is expected to grow to 69% by 2018, the need for widespread adoption of this technology is apparent.”); Song Exhs. 471 & 475.

264. The industry association GSA “forecast the total market for the five LTE Broadcast services modelled will reach around \$14 billion globally by the end of 2020.” Global Mobile Suppliers Association, Evaluating the LTE Broadcast Opportunity (Nov. 2015), at 25.

265. The industry association GSA, whose members include Ericsson, Intel, Qualcomm, Huawei, Nokia, Samsung, Cobham, ZTE, and Drayson Technologies, tracks the market status of eMBMS. In a March 2018 LTE Broadcast (eMBMS) Market Update, GSA identifies AT&T as deploying the technology, and also identifies Samsung Galaxy S5, Galaxy S6, Galaxy S8, and Galaxy S8+ phones as supporting eMBMS. *See* Global Mobile Suppliers Association, LTE Broadcast (eMBMS) Market Update (March 2018) at 5-6, 10. GSA also stated that “A factor that could affect the still nascent device ecosystem is Google’s announcement in 2017 that it had added eMBMS support to its Android Open Source Project (AOSP) and support for eMBMS in the new

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Android 8.1 operating system – a move that will likely make it more accessible to consumers through its inclusion in a much wider range of phones.”

266. According to a recent announcement, the NFL will “stream live games to fans regardless of mobile network.” <https://techcrunch.com/2017/12/11/the-nfl-and-verizons-new-streaming-deal-will-bring-games-to-all-mobile-carriers/> According to the article, “the new deal will cost Verizon over \$1.5 billion over five years.” *Id.*; *see also* <http://www.verizon.com/about/news/nfl-and-verizon-announce-game-changing-partnership-distribute-unprecedented-mobile-access-live> These facts support the conclusion that eMBMS usage is growing and will be increasingly important to handset vendors in the coming years.

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B. BACKGROUND ON THE INVENTION

268. The inventors of the '613 Patent are Junwei Wang, Xiaolan Fan, and Jianghua Liu. Ms. Fan was deposed in this case. Ms. Fan is a Principal Engineer at Huawei, and delegate to 3GPP RAN plenary meetings. Fan Tr. at 31:10-18. As part of her work for Huawei, Ms. Fan regularly attends 3GPP meetings and submits technical proposals to 3GPP. Fan Tr. at 31:19-32:23.

269. Ms. Fan (and her fellow inventors) started working on functionality related to MBMS in 2006. Fan Tr. at 49:18-51:5. During that timeframe, Ms. Fan was conducting research on 3GPP telecommunications standards to analyze technical progress and to find unsolved

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problems or imperfect solutions to problems, that Ms. Fan could contribute to solving. Fan Tr. at 50:22-51:5. The problem that led Ms. Fan and her fellow inventors to the invention of the ’613 patent was how to transmit and receive “multiplexed” services. Fan Tr. at 56:12-57:10. Specifically, 3GPP participants were searching for a way that multicast/broadcast transmissions could be sent on the same carrier and within in the same frame as unicast transmissions. ’613 Patent at 1:54-63.

270. Ms. Fan and her fellow inventors realized that the most efficient way to allow for the multiplexing of services was through the use of “position information.” This information defines a pattern of frames and subframes in which a service can be found. Using this position information, network operators can dynamically schedule and multiplex services and need only transmit a small amount of information to the UE to do so. The UE can use the position information to determine in which frames/subframes a particular service can be found, rather than simply receiving and processing all frames/subframes to look for the relevant service, thereby saving battery life and processing power.

271. The invention of ’613 Patent balanced several different considerations to achieve an efficient solution, including minimizing delay between the service receipt times, conserving power for the UE, and giving sufficient flexibility so that the services can meet their needs. Fan Tr. at 58:2-59:5; 82:5-86:8. The invention saved signaling by dividing the period of time into layers, and could reduce the number of signaling bits needed by a factor of ten compared to a method that assigned a signal bit to every subframe. Fan Tr. at 59:7-61:12. Moreover, by providing position information for the frame/subframe a service could be found, the invention allowed the UE to save battery life by not needing to receive/process every frame or subframe to determine if they contained the relevant service. Moreover, even if the network operator does not